update

UNITED NATIONS CENTRE FOR SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

— Special Issue — Women in Science and Technology

No. 40/Winter 1989/90

Expanding the Role of Women in Development

Throughout history, women have played the pivotal role in the survival of the species through reproduction and child care, as food producers and guardians of nutrition and as a force behind domestic and national economies.

It is estimated that 44 per cent of the world's food is produced by women and that their annual unpaid contribution to GNP is in the order of 4 trillion dollars.

Unfortunately, this stake in home and national affairs has counted for little at the level of decision-making and politics. Women receive about one tenth of the world's salaried income and own about 1 per cent of the property. Although they are the main educators and health providers of young boys as well as girls, they make up about 500 million of the world's 800 million illiterates.

There is a social injustice here which goes beyond the obvious. The failure to fully develop and integrate women's potential is costing society as a whole dearly. Men, who dominate the world's political stage and monopolize the modern world of science and technology, are not doing such a great job that they can afford to relegate 50 per cent of humankind to the margins of productive life. If they were, the world would be less violent and human needs for basics, such as food and shelter, would be less tragically apparent. Science and technology would be focused less on weapons of mass destruction and luxury goods and oriented more towards basic human survival.

The Third World Academy of Sciences and Ronald Leger, of Canada's International Development Agency (CIDA), invited discussion on the subject of science and gender during a conference for women scientists late last year.

"To be blunt, more than half of all the world's research resources are devoted to improving weapons which may threaten our very existence, and two thirds of the remainder is devoted to marginal changes in esoteric or non-essential goods," said Leger, who heads CIDA's division for international non-governmental organizations.

"Belief in our power over nature has

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ATAS News supplement.

UN Photo

Science Grabs UN Spotlight

The 44th Session of the United Nations General Assembly (September-December 1989), was a timely reminder that science and technology for development has become a mainstream item on the agenda of Member States.

At a special commemorative session marking the 10th Anniversary of the Vienna Programme of Action, delegation after delegation referred to the need to integrate S&T into the development process as a means of reducing the great divide between highly industrialized nations and the developing world. United Nations Secretary-General Javier Pérez de Cuéllar noted that modern technologies posed a serious challenge to the ability of many countries to participate in the modern world economy. "New materials are replacing the traditional primary commodities, the export of which has long been the mainstay of many developing countries," he said.

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UN Photo

been responsible for major discoveries, true enough, but it has also been the root of many of our present global perils, such as ecological imbalance, famine and desertification. Another myth of modern science has been that the pursuit of scientifically valid knowledge must be carried out only through objective inquiry. One of the consequences of this approach has been that men and women who do not conform to this vision are discouraged from embracing a scientific vocation.

It has also been said that one of the objectives of science is the pursuit of truth for its own sake. Now, if we agree with this, we must also agree that there are different ways and methods of searching for this truth. This very difference is an asset often underestimated."

Leger maintains that the majority of women see and feel reality in different ways from men, that they view the world in a more holistic way and have the capacity to create bridges and capture the spirit of interdependence. He argues that if these qualities, and a scientific role for women in particular, were nurtured, research would become more fertile in all areas of human inquiry, but especially in the fields of environment, population, basic health and food production.

"These areas call upon science and technology, and by their very nature demand networking and multi-disciplinary approaches. With the insight and leadership of women, the agenda for an approach to science can be modified, in fact elevated, to focus on improvements in the quality of life. This would include the intellectual satisfaction of pursuing knowledge for truth's sake, as well as the moral satisfaction and practical achievement of helping to improve the quality of life for the majority of humanity....The world needs more women scientists."___ ■

Science Grabs UN Spotlight

(Cont. from Pg. 1)

"The decline in the rates of consu tion in the developed countries generally low prices for raw materi have aggravated the already debt crises faced by many de countries."

Mr. Pérez de Cuéllar time lag between scientific and technical appl rowed to years instea and if developing nati were to ness the full potential of technology as a tool for growth, they would have to develop an autonomous capacity to choose those technologies best suited to their circumstances and apply them.

"The world faces a seminal question," he said. "Has technology become an independent force, propelled by its own motion and charting its own course, or can it still be channelled and applied as a means to improve human life?" (See Box this page.)

The General Assembly urged that science and technology be a major component of the forthcoming special session on international economic co-operation (New York, April 1990) and an important consideration in preparations for the United Nations Fourth Development Decade (1991-2000). The Assembly reaffirmed the role of the Centre for Science and Technology for Development as the focal point for technological assessment through its Advance Technology Alert System (ATAS) and also stressed the importance of the United Nations Fund for Science and Technology for Development.

The Assembly adopted by consensus two draft resolutions on the implementation of the Vienna Programme of Action on Science and Technology for Development. The resolutions:

—expressed concern at the growing disparities in technological capability between the developed and developing worlds and stated that science and technology should be a major component of deliberations at the special Assembly session on international economic co-operation.

—called on the organizations of the United Nations system to devote increased attention to national capacity-building in the areas of science and technology.

UN Photo

United Nations Secretary-G eral Javier Pérez de Cué noted that about 25 per cent f global expenditures on research a d development were directed to S&T a plications for military purposes.

"Over half a million of the world's finest scientists and engineers are engaged in the production of weapons and other specialized military equipment," he said.

"This not only diverts scarce human and financial resources from constructive activities but also contributes in the long run to destabilization and political tension. I sincerely hope that the easing of international tensions that we are now witnessing will lead to the redeployment of resources to development activities." ■

—asked the Director-General for Development and International Economic Co-operation to ensure close monitoring and follow-up on the mandated programmes and activities of the UN system.

—asked the Secretary-General to explore the possibility of organizing a more effective coalition of resources to strengthen endogenous capacity-building in the developing world.

—instructed the Secretariat to co tinue the Advance Technology Al System; support publication of t ATAS bulletins; and entrust the Cen for Science and Technology for Dev opment to serve as the focal point f technological assessment.

At the close of the commemorati session, delegations were invited meet with a panel of eminent perso for a discussion on "Peace, Develo ment and the Role of Science a Technology". (See story opposi page.) ■

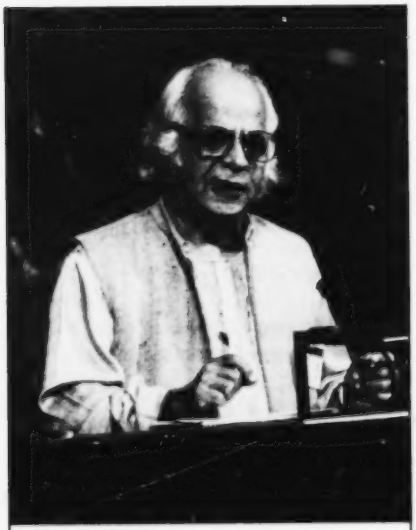
Eminent Persons Deliver Five-point Plan to United Nations General Assembly

A panel of eminent persons convened by UN Secretary-General Javier Pérez de Cuéllar and Chaired by the Director-General for Development and International Economic Cooperation, Dr. Antoine Blanca, has proposed the launching of a bold "Planet Assurance Programme" to help close the North-South gap in technology applications and safeguard the global environment.

The panel has suggested a five-point action programme to:

—include right of access to technology in the Universal Declaration of Human Rights.

—promote high-quality, low-cost technology sharing through grass-roots organizations.



UN Photo

Prof. Yash Pal

—develop an international coalition of Governments, foundations and industries to help build the necessary

—establish a United Nations Commission on Biological Diversity to help safeguard the global "genetic estate" for food and ecological security in all nations.

—initiate case studies to highlight economic and social opportunities which would be created by the diversion of military budgets to a war on hunger and poverty.

infrastructure for science and technology applications throughout the developing world. It was proposed that this initiative should be led by a broad-based Consultative Group on Science and Technology for Sustainable Development.

UN Photo

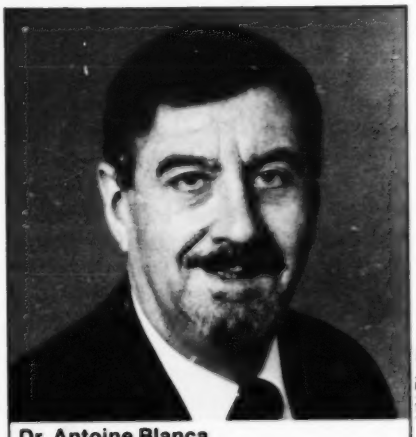
Prof. Abdus Salam

The original idea for a Planet Assurance Programme came from Professor Yash Pal, Chairman of the University Grants Commission of India, and the proposals were presented to the General Assembly (October 26) on behalf of the panel by Professor M. S. Swaminathan, President of the International Union for the Conservation of Nature and Natural Resources.

After the presentation, Professor Abdus Salam, President of the Third World Academy of Sciences and a Nobel Laureate in physics, delivered a keynote address. Professor Salam highlighted the achievements and setbacks for developing countries in science and technology for development and emphasized the need for training opportunities for third world scientists and personnel. He said that the most fundamental distinction between nations of the North and South was the mastery and use of modern science and technology.

"The standard of living of a nation depends on science and technology," he said. "The widening economic gap between nations of the North and South is essentially a science and technology gap."

Professor Salam said that the Third World Academy of Sciences had offered training opportunities to some 16,000 physicists in the developing world over the past 25 years.



UN Photo

Dr. Antoine Blanca

UN Photo

Prof. M. S. Swaminathan

Members of the panel were:

D. Bihute, President, Meridien Bank of Burundi (Burundi); H. Gurgulino de Souza, Rector, United Nations University (Brazil); Khadija Haq, Executive Director, North-South Roundtable (Pakistan); I. Hauchler, Executive Director, Development and Peace Foundation, (Federal Republic of Germany); Maxim Kalaw, Chairman, Haribon Foundation, (Philippines); Peter S. Mmusi, Vice-President, (Botswana); Yash Pal, Chairman, University Grants Commission (India); F. Sagasti, Chairman, UN Advisory Committee for Science and Technology for Development, (Peru); M. Sahnoun, Ambassador of Algeria to Morocco; O. Sala, Professor, São Paulo University (Brazil); A. Salam, President, Third World Academy of Sciences, (Pakistan); W. Scheeler, President, Academy of Sciences, (German Democratic Republic); M. S. Swaminathan, President, International Union for the Conservation of Nature and Natural Resources, (India).

Rice Crops Strengthened by Embryo Rescue

A biotechnology technique called "embryo rescue" is enabling researchers in the Philippines to build the pest and disease resistance of wild rices into domestic crops. The result has been the improvement of domesticated varieties to a point where they now require little or no pesticide.

"Plant breeders previously could not use those valuable genes because wild rices are so different from their domestic relatives," explains Dr. Lesley Sitch, associate cytogeneticist with the International Rice Research Institute (IRRI) in Los Banos. "Embryos resulting from cross-fertilization seldom survived."

To transfer a trait from a wild *Oryza* species, Sitch first fertilizes a cultivated variety with pollen from a wild relative. The hybrid seeds cannot survive like ordinary seeds, so they are harvested after 14 days and their embryos are "rescued" under sterile conditions in the laboratory, where they are cultured in darkness until they germinate. The newly germinated embryos are then placed in the light until they have turned green and developed root systems. From there they are transferred to a nutrient solution and grown in a controlled environment until they are vigorous enough to be planted in soil. Sitch then crosses the sterile hybrid back to its domestic parent several times to improve its plant type and fertility—a process which incorporates desirable traits of the wild species, such as pest resistance, into a good plant type.

Each generation of the progeny is then screened for the desired trait. The final product looks like the original domesticated parent but has the resistance of the wild species and can be used by plant breeders in varietal improvement programmes.

The Institute has found that the chances of finding genes for pest resistance are 50 times greater in wild rices than in domesticated rices, and wild species have so far saved third world farmers hundreds of millions of dollars in crop loss and pesticide costs.

In 1977, genes for resistance to grassy stunt virus were successfully incorporated into IRRI rices from an undomesticated rice from India, and more recently, resistance to the brown planthopper, Asia's most serious rice pest, was transferred from another wild relative.

Dr. Sitch

IRRI

"We have identified a number of useful traits among other *Oryza* species," says Sitch. "*O. eichingeri* from Africa and *O. minuta* from the Philippines have genes for resistance to planthoppers and leafhoppers; *O. brachyantha* and *O. ridleyi* are the only sources of resistance to rice whorl maggot."

The strengths of the wild varieties extends well beyond pest resistance, however. *O. australiensis* grows well under drought conditions, *Porteresia coarctata* flourishes in salty marshes, and *O. granulata*, a forest species, thrives in shaded habitats. In China, the "male sterility" gene of hybrid rices planted on 10 million hectares came from the wild, and these hybrids yield up to 30 per cent higher than traditionally bred improved varieties.

IRRI warns, however, that population growth and urban expansion are destroying the natural habitats of wild rices, and staff from national research systems have been led on a merry chase trying to collect and save seed samples before human "progress" destroys an invaluable resource.

So far IRRI has managed to collect seeds from wild rice species in large areas of Indonesia and India, in the Himalayan foothills, in the flood- and cyclone-ravaged areas of Bangladesh, in the war-torn regions of Indochina and in the acid and saline soils of Sri Lanka and Thailand.

"Seeds of more than 2,000 rare and endangered strains of wild rice are preserved in IRRI's International Rice Germplasm Centre (IRGC)," says Dr Te Tzu Chang, IRRI's principal geneticist and head.

"The IRGC safeguards more than 80,000 traditional rice varieties and assures rice-growing countries of the genetic variability essential to improved rice production. Scientists and Governments withdraw, free of cost, such seeds to use as 'genetic building blocks' to develop improved varieties locally." ■

Shortage of Women in S&T Faculties

A recent Indonesian study found that fewer than one fifth of the nation's students in the physical sciences and technology are women. In 1986, they represented only 16 per cent of all students in the nation's premier engineering school, the Bandung Institute of Technology.

The report, prepared for Indonesia's Office of the Minister of State for the Role of Women, laid the blame on cultural attitudes which press women into early marriage. Around 30 per cent of all women in the cities and 38 per cent of those in rural areas marry before the age of 16.

The report recommends the use of the mass media to educate schoolchildren, teachers, parents and the general public about the importance of women's participation in science and technology and suggests that special scholarships be established for women as an incentive to enrolment in S&T faculties. ■

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ATAS News

A Technology Assessment Supplement

No. 7/Winter 1989/90

ATAS VII—Opening a Window on Space

Thirty years of space exploration have dramatically changed perceptions of our earthly environment and of the stake of all nations in its preservation and development.

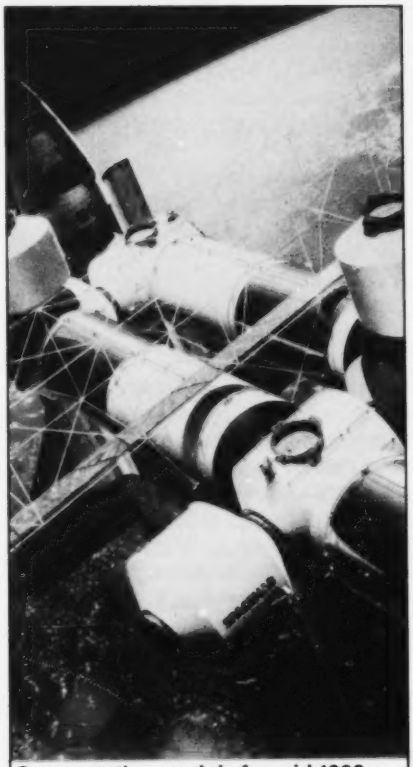
Few, if any, nations are unaffected by the scores of satellites which blink overhead, beaming their signals to earth. The capacity to receive their messages and shape the information they carry for national gain is essentially there for the asking, and nations ignore it at their peril.

Three developing nations—Brazil, China and India—have developed the capacity to put their own satellites into orbit, while others, such as Ecuador, Indonesia and Mexico, have receiving stations to handle space data. Others still share communications, weather and other information through a variety of co-operative arrangements.

The next 30 years in space will extend these connections and interconnections and will expand the opportunities for developing nations, not only as users but as participants in space sciences and technologies.

Given the long lead time for the diffusion of space sciences, and their influence on a broad range of other technologies, the way in which developing countries prepare for and respond to the challenges will probably affect their future roles in the planet's economic and social life.

How to read and interpret these emerging opportunities will be the focus of an ATAS VII project prepared jointly by CSTD and the UN Outer Space Affairs Division. Specialist papers and reference materials will be discussed at four international meetings during 1990 and 1991. A conference will be held in Costa Rica (12-16 March, 1990) followed by three workshops in Europe, the United States and Japan, respectively, on dates to be announced. Specialist papers, reference materials and the results of discussions held at these meetings will be included in an ATAS VII bulletin on space technology and development.



Spacehab

Space station module for mid 1990s

The Costa Rican conference, which CSTD will join, will link the global interests and concerns of the scientific community with those of scientists from North and South America in particular. Its aim is to analyse strategies

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China's Energy Future Tied To Coal

With growing alarm over the relationship between fossil fuel combustion and global warming, the rest of the world is a little nervous about the impact of an expanding Chinese economy on the upper atmosphere. Coal satisfied 70 per cent of China's energy needs in 1980, and according to one recent study, it will continue to dominate the nation's energy sector well into the next century.

The study, entitled "Long Term Economic Development Strategies and Energy Demand Forecasting in China", was presented at a seminar at New York University last September by Professor Xia Shaowei of Tsinghua University, Beijing. It restated the goal of the Chinese Government to quadruple industrial and agricultural output between 1980 and 2000 and summarized the results of a research project, "China by 2000", which forecast energy needs to the year 2030. That report by Professor Xia estimated that China would still be drawing 67 per cent of its total energy needs from coal in the year 2000 and that total commercial energy consumption would be in the order of 1.3-1.5 billion tons a year.

The report acknowledged the atmospheric and environmental pollution associated with coal combustion, and its low utility efficiency compared with other fuels. It also noted that the continued reliance on coal and its shipment to industrial centres was placing a heavy burden on national transportation infrastructure. However, it concluded that because of limited national alternatives, such as petroleum, natural gas and hydroelectric

(Cont. Pg. 2)

Window on Space

(Cont. from Pg. 1)

for future co-operation and integration; identify work plans which incorporate space technologies applicable to Pan American economic development; and to promote the participation of Pan American scientists in international space projects.

There will be five main areas of discussion related to space, accompanied by a high-technology exhibition. They are: space technology, applied space sciences, education, basic space sciences and space law.

The European workshop on "Space Technologies and Applications for Development" will look at the national and international management of available and future space applications, the technology demands created by these applications and the formulation of policy options in response to demand.

The workshop in the United States will consider "Space Technology Spinoffs and Research: Co-operative Roles for Developing Countries" and will look specifically at areas where research and development can be conducted jointly.

The Japanese workshop on "Space Technologies to the Year 2020 and Beyond" will address the issues related to the evolution and management of space technologies internationally. ■

(Cont. from Pg. 1)

power, there would be "no obvious change" in China's energy structure "for a long time to come." ■

Move To Cut CO^2 emissions

The Australian state of Victoria has announced a comprehensive draft strategy to cut carbon dioxide emissions by 20 per cent by the year 2005.

To achieve this, the state government proposes a 20 per cent increase in the use of public transportation to offset emissions from private automobiles, the use of more efficient technologies for burning brown coal, greater use of hydroelectric and solar power and the planting of 100 million additional trees by the year 2010. ■

Getting Information to Small and Medium Enterprises

Successful small and medium enterprises (SMEs) throughout the developing world have an appetite for information which, understandably, is often out of proportion to their size. As a rule of thumb, the smaller the business, the greater its dependence on outside, and almost invariably low-cost, sources of information about manufacturing processes and trading opportunities. The smaller the business, the less likely it is to have the manpower necessary to gather and analyse data which might improve the efficiency and prospects of its operations.

The costs of computer technologies and of access to databases of one kind or another are, however, declining, and the possibilities for networking or sharing information today might depend more on organization than on cold, hard cash.

CSTD and other international organizations which have been set up to smooth the third world's path to technological change have therefore been actively advising all who will listen that while information has a price, it is neither as distant nor as difficult to access as it once was.

In May 1989 in Beijing, CSTD, in concert with the Institute of Scientific and Technical Information of China (ISTIC), the Commission of the European Communities and UNESCO, sponsored an international seminar on Distributed Databases for Small and Medium Enterprises, which looked at China's needs in particular while addressing concerns common to many other industrializing nations as well. It discussed the primary need of SMEs to interact with one another at both national and international levels in order to bring greater awareness of market opportunities and the industrial, technical and scientific resources and data which might be exchanged along the way. The meeting was essentially a design exercise to test new ideas in this field. The next step will be a pilot test of the concept in a practical setting.

The primary needs were identified as:

—information on markets, products, resources, scientific and numeric data;

—training for personnel;

—the means for technology transfers;

—access to patents and information on standards;

—information about equipment and supplies.

It was acknowledged that the present level of database development in China is rather low, but emphasis was placed on the effective use of available technologies, which could be built on later and supplemented in the meantime by the use of flexible delivery options, such as hard copy (reports, catalogues), facsimile transmission, local personal computers and the mailing of diskettes.

A three-stage pilot project was envisaged in which trained personnel would act as "information brokers" to facilitate the flow of information between users and systems by interpreting the subscribers' needs and offerings.

It was suggested that any future project would need to encompass:

—market research—the identification of enterprises and potential users.

—market awareness—the means by which users discover which products are required elsewhere in China or overseas. The need for strong interaction between national and provincial information sources through trained "information brokers" was considered essential.

—market segmentation—the tailoring of information packages by product or production methods for specific user needs. Segmentation would cover such specifics as standards, health and safety regulations, legal and commercial requirements.

The pilot system was to be viewed more as a market experiment than as a technical exercise, however. Its aim would be to develop a deeper understanding of needs and of the potential benefits to users, from the level of township and village enterprises (TVEs), through county, regional and national centres. ■

China Seminar Will Tackle Drought and Desertification

There is no shortage of experience or accumulated knowledge about drought and desertification. In the African Sahel alone, some $77 million was mobilized between 1979 and 1984 to focus on such things as range and water resources management, soil protection and sand dune fixation.

What is apparent 5 to 10 years later, however, is that despite some isolated progress, desertification today is worse in 8 of the 19 Sudano-Sahelian countries, and the overall situation has not improved at all. Some large projects implemented with inadequate understanding of local socio-economic conditions might in fact have done more harm than good.

Against that background, a seminar has been scheduled in Lanzhou, China (25 June-3 July) in the hope of reorienting efforts to combat drought and desertification towards a wider application of science and technology. The seminar aims to:

—formulate a scientific agenda for endogenous capacity-building in site-specific, small-scale situations, taking regional climatic variables into account;

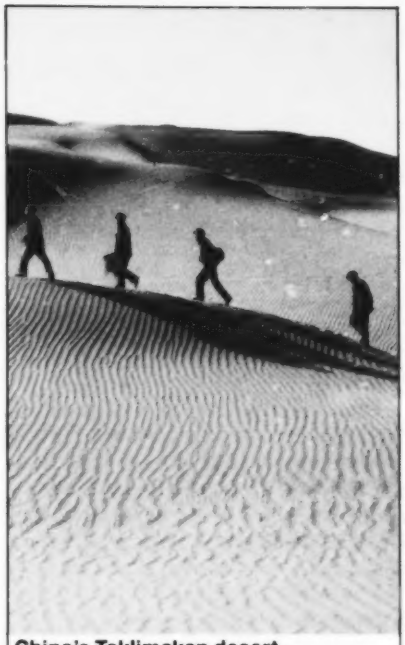
—assess technologies which can be used to raise productivity in arid and semi-arid areas;

—examine patterns of socio-economic, traditional and cultural practices related to drought and desertification in contiguous countries;

—explore potential areas for international co-operation through research and action to combat drought and desertification.

Participants will include scientists, practitioners and some policy-makers from three contiguous areas with extensive experience of drought and desertification: USSR-Mongolia-China-India; West Asia; and the African Sahel.

The seminar has been organized by the Centre for Science and Technology for Development at the request of the People's Republic of China in co-operation with the State Science and Technology Commission. It follows a 1987 meeting of experts in Ashkhabad, USSR, on the application of science and technology to the study, prevention, monitoring and combating of drought and desertification.



Science Press Beijing

China's Taklimakan desert

Lanzhou was chosen as the site for the seminar because of its proximity, as a newly industrialized city, to agricultural areas which are threatened by desertification. The local host institution in Lanzhou will be the Institute of Desert Research of the Academia Sinica. ■

ATAS Tissue Culture

Africa stands to benefit more than any other region from tissue culture and the development of new crops, pastures, forest cover and aquaculture, but African nations cannot afford simply to replace their present dependency on food aid with a long-term dependency on foreign seeds and cultivation systems. Decision makers will need criteria and data for appropriate technology choices. They will need:

—a capacity to assess new technologies in their national contexts;

—a capacity to adapt those technologies to concrete national food-production goals;

—an awareness of the possible ecological and social effects of plant substitutions;

—effective instruments to screen available information and develop long-range science policies towards food production.

These are among the issues to be covered by a regional workshop in Dakar, Senegal in 1990. The subject will be "Biotechnology for Food Production in Dry Areas", and the organizers will be the Centre for Science and Technology for Development and the African Biosciences Network (ABN).

For further information about the seminar, please write to: Dieter Koenig, CSTD/UNU Toho Seimei Building, 15-1 Shibuya 2-Chome, Shibuya-Ku, Tokyo 150 Japan. Fax 81-3499-2828. ■

Pacific Rim Task Force

The Pacific Economic Co-operation Conference (PECC) has decided to establish a Science and Technology Task Force for business and research communities on the Pacific Rim.

At a meeting in Auckland, New Zealand (November 15), the PECC identified three priority areas for the task force, which is to be co-chaired by China and the United States. They are:

—technology transfer and indigenous development;

—human resources development;

—collaborative research and development.

The meeting also agreed that the PECC should hold its first Pacific Science and Technology Symposium in Seoul, from 4-7 November, 1990. ■

Technology Assessment — America's Experience

The United States' Office of Technology Assessment (OTA) will be 18 years old this year. And *ATAS News* invited Peter D. Blair, OTA's Programme Manager for Energy and Materials, to provide a brief status report on OTA, its activities and the way they interface with the American Congress. His response follows:

The United States Congress established the Office of Technology Assessment (OTA) in 1972 to predict and evaluate the full impacts of technology on society. In particular, the goal was for OTA to serve as an early warning system for the Congress regarding new technologies that might have serious, indirect impacts on society, and to provide a decision-maker with a way to forecast the risks and benefits of a new technology in order to make choices about the technology, or among technologies. In practice, the methods of technology assessment used by the agency to analyse highly complex and controversial issues surrounding technology and federal policy, as well as the ways to transmit the results of that analysis to the Congress, have evolved considerably.

The basic structure and purpose of OTA remains unchanged. The agency is governed by a 12-member bi-partisan board of members of Congress, known as the Technology Assessment Board (TAB). TAB is assisted by an Advisory Council of distinguished individuals from the public and private sector. The agency has an in-house staff of about 100 professionals whose skills span the fields of physical, life, political and social sciences, mathematics; engineering; law; and medicine. Throughout each assessment, OTA uses advisory panels of experts and representatives of major stakeholders as a way of ensuring that reports are non-duplicative, objective, fair and authoritative. Projects are generally initiated as formal requests from the standing committees of Congress. Work plans are then prepared by the OTA staff and approved by TAB. OTA receives an annual budget appropriation from Congress, and TAB approval of a project authorises the agency to charge projects against that appropriation. The agency initiates between 15 and 20 new major assessments per year. A typical OTA assessment requires about 18 months to complete before publication.

Many, though not all, assessments initiated early in the agency's history were technology-oriented, i.e., focusing directly on a new technology or technologies, the rationale being that by studying the characteristics of the technology, we can try to anticipate the societal effects from its use. Other assessments were problem-oriented, i.e., focusing on broader issues for which a number of technologies may be applicable. Nonetheless, most of these early assessments were large, first-time comprehensive looks at areas from OTA's unique perspective.

As OTA approaches its 18th birthday, its role in the legislative process has become much better defined. In particular, as legislators have become more aware of the usefulness of OTA's perspective on science and technology issues, the demands on the agency have increased, not just in the form of major projects requested and undertaken, but also in the use of products delivered to the Congress. For example, much more common now are small projects which are related to ongoing or recently completed major assessments, but which are more narrowly focused on the current legislative agenda. For example, in the course of a two-year assessment on the potential role of new electric power technologies, OTA staff testified six times before the various Congressional Committees considering related legislation.

OTA is currently organized into 10 programme areas. They are: Energy and Materials; Industry, Technology and Employment; International Security and Commerce; Technology and Economic Transition (A Special Project); Biological Applications; Food and Renewable Resources; Health; Communications and Information Technologies; Oceans and Environment; Science, Education and Transportation.

For further information, please write to: Congressional and Public Affairs Office, Office of Technology Assessment, US Congress, Washington, DC 20510. ■

Seminar In Tanzania

The World Association of Industrial and Technological Research Organizations (WAITRO) will hold an international seminar on Management of Technology in Arusha, Tanzania, in September (17-22).

The seminar will mark the 20th anniversary of WAITRO and deal with four major concerns: Funding of Technological R&D; Organization and Resource Management; Tools for Technology Management; Factors Influencing Technology Management. The seminar is being organized in co-operation with the Tanzania Industrial Research and Development Organization (TIRDO).

Prospective participants are asked to submit abstracts before 30 March.

For further information please contact WAITRO Secretariat, The Jutland Technological Institute, The Technology Park, DK-8000 AARHUS, Denmark. Fax: 45 86 147722. ■

ATAS News is a regular supplement to the *Update* newsletter of the UN Centre for Science and Technology for Development (UNCSTD). Its objectives are to inform scientists and planners of CSTD's activities in technology assessment (TA), to serve as an information medium for the ATAS Technology Assessment Network (TAN) and to highlight the implications of new technologies for developing countries. *ATAS News* offers readers an open forum to address these and related issues at the national, regional and international levels. Submissions for publication are welcome.

Newsworthy articles, special reports, and photographs and other illustrative material should be sent to: ATAS Cluster, UNCSTD, 1 U.N. Plaza, N.Y., N.Y. 10017, USA. Telex 232422 UNHUR and 62450 UNATIONS. Cable, UNATIONS NEW YORK. Telefax (212) 9634116.

ATAS News is edited by Ian Steele. ■

Poverty and Population Growth Push Environment into Deficit

By Nafis Sadik

Increasing human demands are damaging the natural resource base—land, water and air—upon which all development ultimately depends. Industrialized areas contribute to environmental degradation by their insatiable demands for resources, their production of wastes and the cumulative effects of their activities.

High fertility and rapid population growth in developing countries also contribute to the process. Slower growth and more even distribution of population would help to take pressure off agricultural land, energy sources, vital watersheds and forestlands, giving Governments, the private sector and the international community valuable time in which to evolve strategies for sustainable development.

In the poorest areas, the "scissors effect" of poverty and increasing population is slicing away at their ability to sustain human life.

There is an urgent need for action. World population, now over 5 billion, will be 6 billion by the end of the century. Nearly all of this growth is in developing countries, by definition those least capable of coping with it.

Tropical forests are shrinking by 11 million hectares a year. Topsoil is being lost at the rate of 26 billion tons a year. New deserts are appearing at the rate of perhaps 6 million hectares a year. Tropical developing countries have seen 160 million hectares of upland watershed grossly degraded over the last three decades. In many areas ground water is being used faster than it is being replenished, and salinization and waterlogging affect half the world's irrigated croplands. The amount of land available for agriculture may be shrinking even as numbers and needs grow.

Environmental stress is one cause of uneven population distribution, particularly rapid urban growth, in developing countries. By the end of the century, half the world will be living in urban areas. And one fifth of these people will find themselves in "megacities" of 4 million or more. An uncounted number of people, certainly

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Dr. Sadik

in the tens of millions, have moved across international boundaries in search of a better life. Almost always they migrate to the cities, which are already major sources of environmental damage.

The industrialized countries contain less than 25 per cent of the world's population, yet they consume 75 per cent of the energy used, 79 per cent of all commercial fuels, 85 per cent of all wood products and 72 per cent of all steel production. One consequence is environmental damage: for example, 31 million hectares of forest in Europe and North America are already affected by acids in the air or soil. An unknown quantity of toxic and hazardous waste is being transported across national borders. Transporting the waste is itself hazardous, and too often the disposal sites are unregulated and unsafe.

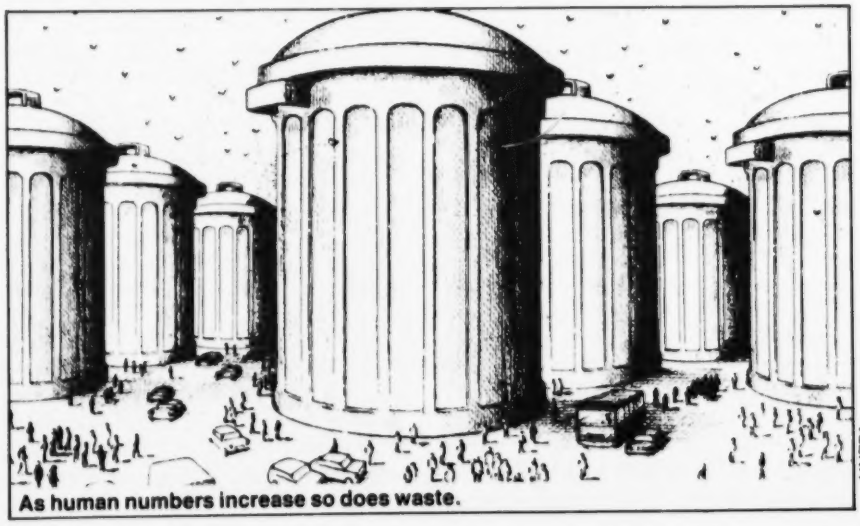
In the industrialized countries urban growth and industrial development had the effect of relieving the pressures of rural poverty and population growth, but at a high cost to the environment. Today, the environmental costs of hazardous industrial technologies and processes are mounting. There are fears that the damage may already be irreversible. To escape from poverty through industrial development may no longer be an option, unless such development contributes to the sustainability of the resources upon which it is based.

This puts a dual responsibility on industrialized countries to take the lead in introducing new and safer technologies and to assist developing countries in their search for safer industrial growth. They also have a responsibility to provide continuing assistance to solve population problems as part of the search for sustainable development.

The effects of resource use, environmental damage and population growth are not confined within national borders. In order to establish a sustainable relationship between growing human needs and available resources, action will be needed on all levels, from the international to the individual.

Rapid population growth, giant cities and the tide of international migration are the result of millions of decisions by individuals. Much of the damage to the resource base is also the

(Cont. Pg. 6)



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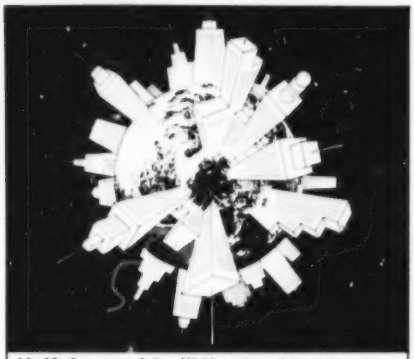
As human numbers increase so does waste.



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Half the world will live in cities by the year 2000.

consequence of individual decisions — to cultivate marginal land, for example, to strip hillsides of trees for fuelwood, to graze land already showing signs of exhaustion. But frequently the agents of destruction have little real choice. They are driven by the utter necessities of poverty, or the decisions of others.

Some developing countries have succeeded in slowing population growth. Their experience shows how individual decisions affecting family size respond to national policy. But it also demonstrates how national development policy and planning can respond to the needs of individuals and communities — and put the power of choice in the hands of those making the decisions.

The successful countries are not the richest or most favoured by natural conditions. But they are committed to slower population growth and they are able to translate commitment into policy.

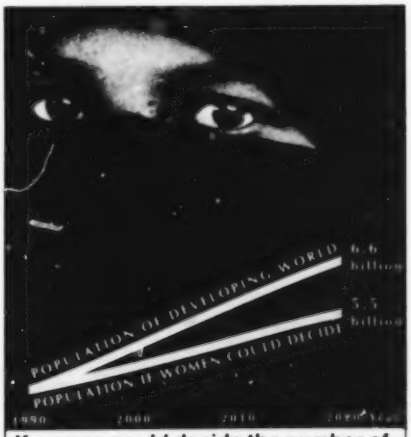
Countries with slower growth generally have a narrower income gap between the richest and the poorest groups in the population. Literacy is higher, infant mortality lower, nutrition better and society in general more stable. They pay more attention to rural development, and to stemming unplanned urban growth, than countries with higher population growth rates.

They tend to demonstrate a commitment to social as well as economic development, particularly as regards women. Women in these countries are generally better educated, stay longer in school and marry later. They are healthier, and so are their children. They have fewer children but also lose fewer. They are more likely to work outside the home and have more rewarding jobs than their counterparts elsewhere. They are nearer to the mainstream of economic development.

International policies and events affect resource use and population growth and distribution in developing countries. For example, protectionist policies in a handful of industrial countries may cost developing countries' agriculture $30 billion a year in lost income — more than 50 times total population assistance. At the other end of the scale, fluctuations in the international prices of primary products — sugar, tea, timber or tin, for example — can have quite devastating effects on the poor in the producing countries.

Methods are now being developed to build into economic status reports and forecasts the true costs of resource use and abuse; the economic effects of population growth and concentration, and their impact on natural resource capital; the availability and condition of critical resources, such as arable land, potable water, forest cover, wildlife and mineral reserves; and the effect of proposed development activities on all these areas.

The question is urgent because the planet is already beginning to pay a terrible price for neglecting "environmental accounting". ■



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If women could decide the number of children they will have, population growth would decline.

About the Author

Dr. Nafis Sadik is the Executive Director of the United Nations Population Fund (UNFPA). This article was taken from the publication *Safeguarding the Future*, which deals at length with the links between population, environment and resources. Copies of *Safeguarding the Future* are available for $US 6 from United Nations Publications, United Nations DC2, Room 853, New York, N.Y. 10017.

Development in Latin America

The United Nations Economic Commission for Latin America and the Caribbean (ECLAC) has long been the centre of much of the debate on development policy and the severe economic crisis of the region. And a book reflecting this debate is due to appear in May 1990: *Progress Toward Development in Latin America: From Prebisch to Technological Autonomy*, edited by James L. Dietz (California State University) and Dilmus D. James (University of Texas).

The book combines the editors' contributions with those of other distinguished scholars of Latin American development (Oswaldo Sunkel, Robert Alexander, James Cypher, William Glade, Ron Phillips, Hugh Schwartz, William Cole), and critically traces the evolution of Latin American Development theory beginning with the late Raul Prebisch, Executive Secretary of ECLAC and Secretary-General of UNCTAD. After a critique of structuralism as a theory of economic development, the book reviews experiences with State enterprises, unmanageable indebtedness and the export of goods manufactured in the region. The authors propose innovative strategies for renewed growth and equity, focusing on the removal of internal obstacles to change while building the processes and institutions that strengthen endogenous technological progress. The book will be of particular interest to S&T scholars and practitioners. It advances a sustainable development model essentially based on the building of technological capabilities.

James L. Dietz and Dilmus D. James, eds., *Progress Toward Development in Latin America: From Prebisch to Technological Autonomy* (Boulder, Colorado; Lynne Rynner Publishers, 1990), 250 pp. ISBN: 1-55587-179-8, cloth $32.50. ■

Women About to Graduate in Bangladesh

Over the next few months the first graduates of Bangladesh's Mohila Polytechnic Institute (MPI) will receive their diplomas in architecture and electronics. But their entry into the job market will be as much a challenge to the community as it will be to the graduates—all of them women.

Only 6 per cent of urban women in Bangladesh work outside the home, so no one can be sure just how well they will be received, particularly in such traditional male strongholds. It was precisely women's inequality of opportunity, however, which prompted the Government of Bangladesh, with help from the Kingdom of Saudi Arabia and the United Nations Educational, Scientific and Cultural Organization (UNESCO), to establish a women's polytechnic in Dhaka, and it is unlikely that the showcase project will be allowed to fail.

The Government gave land for the MPI, the Saudis contributed $1.9 million and UNESCO provided the expertise to restructure an outdated and male-biased curriculum, requisition equipment and obtain the necessary textbooks and publications.

The MPI currently has some 200 students enrolled in the three-year courses, which have been in extraordinary demand. About 1,000 young women with more than 10 years of schooling applied for just 80 vacancies last year. ■

UNESCO

Students at the Mohila Polytechnic Institute

UNESCO

Microbiology analysis — Cuba

Hiroko Morita-Lou

A number of Nepalese women have established a presence in the nation's private sector. Among them is Ms. Yanzi Sherpa (above) Managing Director of Structo Nepal, Ltd., a manufacturer of mini hydropower generators and steel structures for bridges.

Capacity Building In Nepal

More than 40 major stakeholders in the Nepalese economy met in Kathmandu (2-3 November) for a second round of policy dialogue on endogenous capacity-building in science and technology for development.

The meeting was jointly organized by CSTD and the Royal Nepal Academy of Science and Technology (RONAST) and focused on the development of export-oriented industries and energy development—two critical areas of current concern in Nepal. On the basis of understandings reached between leaders in the public and private sectors, a local consultant has been asked to prepare a portfolio of proposals to be reviewed by a number of participants in the second round for concrete follow-up action. These proposals will be the subject of a third and final round of dialogue in April 1990.

CSTD also organized an Inter-agency Mission (Kathmandu, November 5-9) to review the impact of United Nations S&T activities in Nepal. The mission was the second in a series proposed by the ACC Task Force on Science and Technology for Development, to:

—assess the role the United Nations system has played in developing endogenous capacity in developing countries;

—identify means for closer co-operation between agencies in this area;

—propose measures for effective follow-up.

The mission concluded that the mechanisms for co-ordination in Nepal between multilateral and bilateral agencies and the United Nations system were operating satisfactorily, but there was a lack of focus on endogenous capacity building (ECB) ■

Ethiopian Scientists Win Major Award

The Swedish Right Livelihood Society has honoured Dr. Aklilu Lemma and Dr. Legesse Wolde-Yohannes of Ethiopia for their work to develop and win acceptance for a low-cost molluscicide made from the native African endod or soapberry bush *(phytolacca dodecandra). (ATAS News No. 3)*

The Right Livelihood Award, which has been described by some as the "Alternative Nobel Prize", cites a 25-year-long struggle by both scientists to gain international recognition for endod. An extract from endod berries has proved to be effective against snails, which carry the bilharzia parasite. Bilharzia, or schistosomiasis, is a debilitating and eventually fatal illness afflicting more than 200 million people in Africa, Asia and Latin America.

Endod's acceptance and development for widespread use in the developing world has been hindered largely by a lack of interest in the developed world to support toxicology studies which would give it an international seal of approval.

As reported in *ATAS News* last fall, however, the merits of endod have won some influential converts as well as financing for testing under international laboratory standards. Large-scale field evaluations are under way in Ethiopia, Zambia, Swaziland and Zimbabwe under the supervision of an advisory group of the International Development Research Centre of Canada (IDRC). When the studies are completed, it is expected that endod will be registered in Canada as a pesticide.

Dr. Robert M. Parkhurst, senior organic chemist at Stanford Research Institute in California, believes that endod will pass the tests with flying colours. "I think the toxicology has been done already," he said last year. "It just hasn't been done by the 'recognized source'. People just don't want to believe anything that comes out of a third world university, and that's too bad." ■

Dr. Lemma

UN Photo

Dr. Legesse

Ian Steele

Guidelines For Robots in The Workplace

The International Labour Organisation (ILO) reports that the global robot population is likely to reach 10 million by the year 2000.

Japan has the largest robot population (about 141,000) and has used them ingeniously to take over many hazardous work functions, but as their numbers in the workplace have grown, so too have the number of robot-related accidents. A number of fatalities and injuries to human co-workers have been attributed to operational errors on the part of the victims or to the "spontaneous" starting of a robot.

The ILO has responded to the risks posed by these "steel collar workers" with a study which sets out basic principles and practices to make work with these machines safe. ■

Survival 2000 Symposium

The B. M. Birla Science Centre in Hyderabad, India, will hold an international symposium (March 16-18) to address major challenges to humankind in the final decade of the 20th century.

For further information on the "Survival 2000" symposium, please contact: Dr. B. G. Sidarth, Director, B. M. Birla Science Centre, Adarshnagar, Hyderabad, 500 463 India. ■

For further information, contact:

Centre for Science and Technology
for Development
United Nations
New York, New York 10017
United States of America
Telephone: (212) 963-6692

Update and ATAS News
Edited by Ian Steele

"...A periodic newsletter to keep national authorities, United Nations organizations and intergovernmental and non-governmental organizations informed of the progress made and related developments regarding the implementation of the Vienna Programme of Action" (IGC resolution 5(II)).

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